

**ABSTRACT**

Vapor sensing systems and methods are disclosed. An appliance  
5 such as a gas water heater, clothes dryer, and the like can be associated  
with a controller for controlling the appliance. A vapor sensor is also  
associated with the appliance, such that the vapor sensor comprises an  
active sensor and an error sensor, wherein the active sensor generates an  
active signal and the error sensor generates an error signal. An amplifier is  
10 also associated with the vapor sensor, such that the amplifier subtracts the  
error signal from the active signal to generate a compensated signal  
indicative of the presence of an ignitable vapor within a vicinity of the  
appliance and thereby instruct the controller to shut down the appliance.